Envoie

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

[X] Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 165.00

Complete if Known	
Application Number	09/975,507
Filing Date	10/12/2001
First Named Inventor	Ken C.K. Cheung
Examiner Name	T. Dinh
Art Unit	3644
Attorney Docket No.	OCEANIT

METHOD OF PAYMENT *(check all that apply)*

[X] Check [ ] Credit card [ ] Money Order [ ] Other [ ] None

[ ] Deposit Account:

Deposit Account Number

Deposit Account Name

The Director is authorized to: *(check all that apply)*

[ ] Charge fee(s) indicated below [ ] Credit any overpayments

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below		Fee Paid
Total Claims		-20** =		X	=
Independent Claims		- 3** =		X	=
Multiple Dependent					=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	165
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 165.00

SUBMITTED BY				(Complete *(if applicable)*)	
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

CHEUNG et al.

Serial No.: 09/975,507 Art Unit: 3644

Filed: October 12, 2001 Examiner: T. Dinh

For: CONFORMABLE SKIN ELEMENT SYSTEM FOR ACTIVE VORTEX CONTROL

APPEAL BRIEF

To the Commissioner of Patents and Trademarks

Sir:

REAL PARTY IN INTEREST

OCEANIT LABORATORIES, INC. is the real party in interest in the above identified case by virtue of an assignment filed November 21, 2001, recorded on reel/frame 012316/0811.

RELATED APPEALS AND INTERFERENCES

No other related appeals or interferences is pending.

STATUS OF CLAIMS

Claims 1-7, 15, 17-37, and 40-47 were finally rejected.

Claims 8-14, 16, 38 and 39 have been withdrawn from consideration.

A copy of the appealed claims is appended hereto in the Appendix.

STATUS OF AMENDMENTS

No amendments were filed after the final rejection.

SUMMARY OF THE INVENTION

The invention (Specification pages 2-8 and Figures 1-5) relates to a conformable skin element system for active vortex control. Figure 1 is a schematic diagram of conformable skin element system 20 with a feedback control loop consists of conformable skin elements 1. The skin elements 1 all have connections 22, preferably electric connections, to a micro-controller 2. Micro-controller 2 may be, for example, a computer chip that determines which skin elements to activate depending on sensed signals from feedback 4. Power supply 3 is provided 24 to the micro-controller 2 from any known power supply such as, but not limited to, battery or vehicle power (specification page 5, lines 12-20).

The skin elements act as pressure-transducers and provide pressure-transducer signals 26 to the feedback loop 4. Feedback loop 4, which comprises amplifiers and filter, takes the pressure-transducer signals 26 and amplifies and filters the signals and transmits 28 to micro-controller 2 (specification page 5, lines 21-25).

Figure 2 shows different configurations 32, 34, 36, exemplary of the skin elements. Forebody 5, 6, 7, viewed from a front vantage point has tip 38 generally in the center of the forebody. The skin elements are distributed circumferentially

about tip 38 in the forebody. The skin elements may be single or multi-layered. Forebody 5 has multiple single layers 32 of skin element around the tip 38. Forebody 6 has multiple layers 34 of skin elements. Forebody 7 has, for example, minimum required skin elements: a skin element 36 on either side of windward ray, approximately for example, but not limited to, 50-120 degrees apart from each other (specification page 6, lines 1-11).

Figure 3 shows examples of different shapes of piezoelectric skin elements such as, but not limited to, triangular - equilateral 8 or isosceles 9; elongate strips 10; strips with pointed end(s) 11; oval 12; and rectangular 13 (specification page 6, lines 12-15).

Figure 4 shows the mounting and deflection of skin elements on a vehicle 40. Surface 14 of the aerodynamic vehicle 40 has skin layer 15. Conformable skin element 16 is flush-mounted with skin surface 14. After deflection skin element 16 has a shape 17, here shown as a bulge shape from mounting perimeter 18. Wires 42 are connected to the skin elements and lead to micro-controller 2 and feedback loop 4 (Figure 1). The shape of the skin element after deflection varies. For example, in Figure 4, the deflected skin element shape is not a bulge since the element has a cantilever mounting on the surface 14 (specification page 6, lines 16-25).

The inventive conformable skin element may be used for active vortex control. A preferred embodiment has piezoelectric material comprising conformable skin element. Other materials

within the scope of this invention include, but are not limited to, electromechanical, electromagnetic or otherwise actuated material which comprise the conformable skin element, including temperature, light, pneumatic, hydraulic, and magnetically affected shape-changing materials. Examples include shape memory alloys (SMA) and magnetic elements. The preferred piezoelectric material may be piezo-ceramic, piezo-ceramic with metal shim, piezoelectric bimorph, or piezo-film (specification page 7, lines 1-10).

The preferred skin-element size ranges from millimeters to several centimeters in length, with deformations typically in the millimeter range. The skin element acts as a pressure transducer as well as flow modifier. The preferred micro-controller or micro-computer is used to control the system. The system power supply may be, for example, via battery or vehicle on-board power. Feedback loop controls the skin-element activation based on surface pressures measured. This provides a closed-loop operation of the system. The system may also use separate conventional pressure transducers (taps, manometer, surface mounted) instead of skin elements for feedback loop. Wires conducting voltage to the elements and transmitting pressure voltage via feedback loop may be located under the skin surface (specification page 7, lines 11-23).

As exemplified in Figure 5, the skin element 16 may be mounted on surfaces 16 with, for example, adhesive 44, clamp 46, or screw set 48 (specification page 7, lines 24-26). The

mounting may be on the skin about a perimeter for bulge deflection or may be cantilever style for cantilever deflection. Multiple elements may be mounted circumferentially about a tip of the forebody, as close to the tip as possible. The invention may be a minimum of two elements, mounted one on either side of windward ray, approximately 50-120 degrees apart from each other. For applications with roll variability, the element may be evenly distributed about the nose of the forebody. For applications with no roll variability, greater concentration of the skin element is provided on the windward half (specification page 8, lines 1-10).

Different shapes and sizes depending on application, including triangular, strip, pointed strip, oval, rectangle elements are within the scope of this invention. The resolution and placement of skin elements may be varied based on its applications and scenario where it is in use (specification page 8, lines 11-15).

ISSUES

Whether claims 1-6, 15, 17-24, 25, 28, 29, 31, 36, and 47 are patentable under 35 U.S.C. 102(b) over Lurz (U.S. patent 4,516,747) ("Lurz")?

Whether claims 26, 27, 32, 33-35, and 41-46 are patentable under 35 U.S.C. 103(a) over Lurz in view of Blackwelder et al. (U.S. patent 4,697,769) ("Blackwelder")?

Whether claim 7 is patentable under 35 U.S.C. 103(a) over Lurz in view of Mangalam (U.S. patent 5,218,863) ("Mangalam")?

Whether claim 30 is patentable under 35 U.S.C. 103(a) over Lurz in view of McKillip (U.S. patent 5,752,672) ("McKillip")?

Whether claims 37 and 40 are patentable under 35 U.S.C. 103(a) over Lurz in view of Wygnanski (U.S. patent 5,209,438) ("Wygnanski")?

GROUPING OF CLAIMS

Each of the present claims is separately patentable. The claims do not stand or fall together for the following reasons.

ARGUMENTS

Each of the present claims is separately patentable under 35 U.S.C. 102(b).

For an invention to be anticipated, it must be demonstrated that each and every element of the claimed invention is present in the "four corners" of a single prior art, either expressly described therein or under the principle of inherency. Lewmar Marine Inc. v Barient Inc., 3 USPQ2d 1766, 1767-1768 (CAFC, 1987). The absence from prior art reference any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible, Inc., 230 USPQ 81, 84 (Fed. Cir. 1986).

Claims 1-6, 15, 17-25, 28, 29, 31, 36, and 47 are patentable under 35 U.S.C. 102(b) over Lurz.

The present invention is a conformable skin element system comprising one or more conformable skin elements, a controller, connections for coupling the conformable skin elements and the controller, a feedback control loop for generating and transmitting signals between the skin elements, the controller and the connections for conforming the skin elements to desired deformations. The skin elements may be adapted for active vortex control by mounting on a surface and forming a pressure transducer and flow modifier on the surface.

Claim 1 describes a conformable skin element system comprising one or more conformable skin elements, each skin element forming a pressure transducer and flow modifier. Claim 31 describes an active vortex control apparatus comprising a surface, a skin element mounted on the surface, the skin element forming a pressure transducer and flow modifier on the surface. Lurz describes a system which uses plural sensors 1, 3, 4, (which the Examiner refers to as parts 1-4; see, office action page 2, last paragraph) and vibration transmitters 2 on the surface 5 of a body 6 over which flow passes. Nothing in Lurz describes, teaches or inherently provides skin elements that are also transducers/flow modifiers.

Claim 1 further describes a controller, connections for coupling the conformable skin elements and the controller, a feedback control loop for generating and transmitting signals

between the skin elements, the controller and the connections for conforming the skin elements to desired deformations. Claim 31 further describes a micro-controller coupled to the skin element, a power supply connected to the micro-processor, a feedback loop communicating with the skin element and the micro-processor for controlling activation of the skin-element corresponding to surface pressures on the skin element. Lurz mandates that the transmitters 2 be positioned between the sensors 1, 3, 4, and following each of the sensors, for measuring the degree of turbulence along the flow path from sensors 1 to 3 to 4 and over transmitters 2 between each of two adjacent sensors (see column 3, lines 48-68, to column 4, lines 1-12), where the transmitters are to be disposed one behind the other (column 4, lines 28-43).

Lurz requires the measurement of signal difference sensed by the sensors 1, 3, 4, located before and after each vibration transmitter 2 to determine whether the amplitude is smaller or larger than the amplitude measured by the previous sensor. Lurz requires those measurements because only then can the Lurz device be used to determine whether to have a frequency analysis of the wall shearing stress signals or degree of turbulence signals for subsequent dampening or strengthening of the dominant frequencies. Nothing in Lurz describes each and every element as claimed. Therefore, Lurz cannot anticipate nor render obvious the present invention. For an invention to be anticipated, it must be demonstrated that each and every element of the claimed invention is present in the "four corners" of a single prior art,

either expressly described therein or under the principle of inherency. Lewmar Marine Inc. v Barient Inc., 3 USPQ2d 1766, 1767-1768 (CAFC, 1987). The absence from prior art reference any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible, Inc., 230 USPQ 81, 84 (Fed. Cir. 1986).

Claim 2 adds that the controller is a micro-controller and claim 3 adds that the micro-controller comprises programmable computer chips for sensing and processing the signals from the feedback and for selectively activating the skin elements to desired deformations. Lurz has analyzer control circuits 7 which receives the measurements from sensors 1, 3,4, and sends periodic control signals to vibration transmitters 2. Nothing in the reference teaches the claimed micro-controller of programmable computer chips as defined in claims 2 and 3.

Claim 4 defines the connections are electrical connections which is not taught nor described in Lurz. Claim 36 adds to claim 31 wires communicating with the skin element, the feedback loop, and the micro-controller for conducting voltage to the skin element and for transmitting pressure signals from the skin element via the feedback loop to the micro-processor.

Claim 5 adds a power supply connected to the micro-controller which is absent in Lurz.

Claim 6 adds that the skin elements are pressure-transducers and wherein the signals are pressure-transducer signals provided to the feedback loop. Claim 15 defines the skin elements are shaped elements. Claim 47 describes the skin elements are shaped

elements. Claim 17 adds that the shaped elements have a configuration of at least two sides. Claim 18 defines the shaped elements have a configuration of more than two sides. Lurz provides a surface insulated from the body and plural sensors disposed in front of and behind vibration transmitters 2 to measure signal difference in front and behind every transmitter and analyze that difference. Lurz has nothing to do with skin elements forming the pressure transducers which themselves provide signals to the feedback loop nor the shaped skin elements that form the surface transducers.

Claim 19 adds a surface on which the skin elements are mounted. Claim 20 describes the surface is on a vehicle and claim 21 provides that the surface is on an aerodynamic part of the vehicle. These features uniquely allow for skin element transducers to be positioned in flow sensitive areas of aerodynamic bodies without adding bulk. Contrarily, Lurz requires material that are to be insulated from the body and that must have sensors and transmitters located along the entire material for Lurz to work.

Claim 22 adds that each skin element has a vehicle conformable shape from a mounting perimeter after activation. Claim 23 adds that the conformable shape corresponds to a mounting pattern of the skin elements on the surface. Lurz provides particles that can be subjected to vertical or horizontal vibration along the turbulent boundary layer for reducing wall friction. However, the claimed invention conforms

the shape of the entire skin element on activation thereby continually maintaining least resistance and less friction to flow direction, which is not taught nor described in Lurz.

Claim 24 describes the system is an active vortex controller, which is not taught nor suggested by Lurz. The claimed skin elements being conformable provides to active vortex controller system unlike the friction reduction by particle vibration taught by Lurz.

Claim 25 describes the skin elements comprise actuatable material. Claim 28 adds that the actuatable material is selected from a group consisting of electrical, mechanical, electromechanical, electromagnetic, electrothermal actuatable material and combinations thereof. Claim 29 provides that the material is selected from a group consisting of shape-changing materials sensitive to temperature, light, pneumatic, hydraulic, magnetic effects and combinations thereof. Lurz does not teach, describe or inherently provide a skin element that conforms its shape according to demands and that is of material described in claims 25, 28, 29, that uniquely conform the claimed skin element as required.

Lacking all the claimed elements the reference cannot anticipate the present claims.

"To establish inherency, the extrinsic evidence 'must make it clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.'" In re

Robertson, 48 USPQ2d 1949, 1951 (Fed. Cir. 1999) quoting from Continental Can Co. v. Monsanto Co., 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. **Id. 20 USPQ2d at 1749**.

Lurz further provides that the transmitters receive periodic analyzer control signals after the sensors 1, 3, 4, relay measurements to the analyzer control circuits 7. Lurz states that once the turbulence flow measurements are made and signals relayed to the transmitters then the sensor-transmitter combined system may be positioned as shown in Figure 3. In laminar boundary layers 8 the combined systems are arranged for dampening vibrations, in the turbulent boundary layer 9 they are arranged for reducing degree of turbulence and wind shearing stress and in the turbulent layer 10 further down from layer 9 they are arranged for increasing the degree of turbulence and increasing energy supply (see column 4, lines 44-65).

Nowhere in the entire Lurz reference there is a description, teaching or suggestion of conforming the skin elements responsive to signals received from the same skin elements as uniquely defined by the present invention.

Lacking the crucial claimed elements, the reference cannot anticipate the present claims.

Since the cited reference does not disclose all the elements of the present invention, the reference cannot anticipate the

present invention. Thus, lacking an element of the claims, the reference cannot anticipate the invention. Carmen Indus., Inc. v. Wahl, 220 USPQ 481, 485 (Fed. Cir. 1983).

The present claims are patentable under 35 U.S.C. 103(a).

In considering the patentability of the present invention, it is requested that the Board consider the invention as a whole, consider the scope and content of the prior art as a whole, consider the differences between the claims at issue and the prior art, and consider the level of ordinary skill in the art to which the invention pertains at the time the invention was made. **Graham v. John Deere Co., 148 USPQ 459, 467 (1966).**

THE INVENTION AS A WHOLE

The invention considered as a whole is best described by the appended claims.

PRIOR ART AS A WHOLE

The prior art to which the invention pertains is typified by the references of record.

DIFFERENCES BETWEEN THE INVENTION AND THE PRIOR ART

Each of the present claims defines unique features and each is individually patentable over the art of record.

The test in reviewing rejections under 35 U.S.C. 103 in which the examiner has relied on teachings of several references,

is whether references, viewed individually and collectively, would have suggested claimed invention to a person possessing ordinary skill in the art, and citing references which merely indicate that isolated elements and/or features recited in the claims are known is not a sufficient basis for concluding that combination of the claimed elements would have been obvious. Ex parte Hiyamizu, 10 USPQ2d 1393-1395 (Board of Patent Appeals and Inter., 1988); In re Kaslow, 217 USPQ 1089 (Fed. Cir. 1983); In re Deminski, 230 USPQ 313 (Fed. Cir. 1986).

Claims 26, 27, 32, 33-35, and 41-46 are patentable under 35 U.S.C. 103(a) over Lurz and Blackwelder.

As previously pointed out, Lurz does not teach nor suggest the claimed invention. Any further combination would therefore lead away from the present claims.

Claim 26 adds to claim 25 that the material is piezoelectric material. Claim 27 adds to claim 26 that the piezoelectric material is selected from a group consisting of piezo-ceramic, piezo-ceramic with metal shim, piezoelectric bimorph, piezo-film, and combinations thereof. Lurz requires crystals or particles for the horizontal and vertical vibrations mandated by that reference which has nothing to do with the entire skin element being conformable due to the piezo-electric material skin element.

Claim 32 adds that the feedback loop is a closed-loop system, which is not taught nor suggested by Lurz.

Claim 33 adds additional pressure transducers communicating with the feedback loop. Claim 34 adds that the additional pressure transducers are additional layers of the skin element. Claim 35 adds that the additional pressure transducers are one or more layers of the skin element. Lurz requires particles embedded in layers insulated from the body for vibrating and reducing friction. Nothing in Lurz provides the claimed conformable skin elements forming the transducers nor the additional layers of the skin elements as claimed.

Claim 41 defines the surface is an aerodynamic forebody which is not expressly taught by Lurz.

Claim 42 adds plural skin elements mounted circumferentially about a tip of the forebody. Claim 43 adds that the plural skin elements comprise two skin elements mounted one on either side of a windward ray of the forebody. Claim 44 adds that the two skin elements are mounted about 50-120 degrees apart from each other. Claim 45 describes the skin elements are evenly disposed about a nose of the forebody for accommodating roll variability. Claim 46 adds that the skin elements are concentrated on a windward half of the surface having no roll variability. Again, Lurz does not teach nor describe conformable skin elements that conform their shapes according to the flow sensed and relayed by the same skin elements.

Blackwelder has been relied on as teaching piezoelectric material. In Figure 7 Blackwelder teaches that the airfoil 21 with piezoelectric array 22 be embedded in the leading edge of

the body and airfoil 21. That teaching contradicts the airfoil arrangement taught by Lurz which requires alternate sensor and transmitter arrangement and disposing of the Lurz air foils along the entire length of the body. Therefore, Blackwelder cannot be combined with Lurz because they are mutually contradictory teachings. Thus, the present claims cannot be rendered obvious with teachings of references that inherently are inapposite.

The courts have held, when the prior art contains apparently conflicting references, [the Board] must weigh each reference for its power to suggest solutions to an artisan of ordinary skill. In weighing the suggestive power of each reference, [the Board] must consider the degree to which one reference might discredit another. In re Young, 18 USPQ2d 1089, 1091 (CAFC, 1991).

Claim 7 is patentable under 35 U.S.C. 103(a) over Lurz and Mangalam.

As previously pointed out, Lurz does not teach nor suggest the claimed invention. Any further combination would therefore lead away from the present claims.

Claim 7 adds to claim 6 that the feedback loop comprises amplifiers for amplifying the signals and filters for filtering the signals transmitted to the micro-controller, which is absent in Lurz.

Mangalam has been relied on as teaching amplifiers and filters. Given Lurz's teachings of measuring boundary layer degrees of turbulence and accordingly positioning the combined

sensor-transmitter systems, there is no showing as to why one of ordinary skill in the art would be motivated to amplify and filter the signals either received from the Lurz sensors or sent to the Lurz transmitters. Of course, such a teaching can be garnered from hindsight reconstruction using the present invention as a guide. However, such reconstruction cannot form a basis for any obviousness holding.

"It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." In re Fritch, 23 USPQ2d 1783, 1784 (CAFC, August 1992), quoting from In re Gorman, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). "This court has previously stated that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." **Id.** quoting from In re Fine, 5 USPQ2d 1600 (CAFC, 1988).

Claim 30 is patentable under 35 U.S.C. 103(a) over Lurz and McKillip.

As previously pointed out, Lurz does not teach nor suggest the claimed invention. Any further combination would therefore lead away from the present claims.

Claim 30 adds to claim 25 that the material is selected from a group consisting of shape memory alloys, magnetic elements and combinations thereof, which is absent in Lurz.

McKillip has been relied on as teaching actuatable materials such as shape memory alloys. The Examiner then replaces the Lurz transmitters 2 with the alloys of McKillip to hold claim 30 to be obvious. The Examiner's modification does harm to the carefully designed Lurz device which mandates the adjacent positioning of the Lurz sensors and the Lurz transmitters, particularly the transmitters to be positioned one after another adjacent to the sensors. Lurz mandates that pattern even in the airfoil configuration. Therefore, it is not understood as to why one of ordinary skill would do harm to the Lurz device which would only function if designed according to teachings in that reference and replace it with the McKillip alloy without benefit of such a teaching from either of those references.

That [the prior art] might incorporate elements which could be used in appellants' system does not render appellants' claims obvious when there is no suggestion of using these elements in substantially the same manner as appellants use them. In re Donovan, 184 USPQ 414, 421 (CCPA, 1975).

Claims 37 and 40 are patentable under 35 U.S.C. 103(a) over Lurz and Wygnanski.

As previously pointed out, Lurz does not teach nor suggest the claimed invention. Any further combination would therefore lead away from the present claims.

Claim 37 adds to claim 31 mounts on the surface for mounting the skin element, which is absent in Lurz.

Claim 40 adds to claim 37 that the mounts are cantilevered on the skin element for allowing a cantilever deflection of the skin element. Lurz does not teach nor suggest those claimed features.

Wygnanski has been relied on as teaching actuatable material mountable as a cantilever. However, that contradicts the Lurz mandated mounting of the combined sensor-transmitter system along the body for controlling turbulence and wind shearing stress.

Nothing in the references, either singly or in combination, teaches or suggests the claimed features. Therefore, the references cannot anticipate nor render obvious the present invention as claimed.

Citing In re Gordon, 221 USPQ, 1127, the court pointed out, "the mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification". In re Fritch, 23 USPQ2d 1783, 1784 (CAFC, August 1992). In the same case, In re Gordon, the court found a proposed modification inappropriate for an obviousness inquiry when the modification rendered the prior art reference inoperable for its intended purpose.

Nothing in the references teaches, suggests or motivates one of ordinary skill in the art to combine the references in the manner proposed by the Examiner.

In In re Fine, 5 USPQ2d 1596, 1599 (Fed. Cir 1988), the Court observed:

> "Because neither [reference], alone or in combination, suggests the claimed invention, the Board erred in affirming the Examiner's conclusion that it would have been obvious to substitute the [secondary reference features] in the [primary system]. The [references] disclose, at most, that one skilled in the art might find it obvious to try the claimed invention. But whether a particular combination might be 'obvious to try' is not a legitimate test of patentability. In re Geiger, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987); In re Goodwin, 198 USPQ 1, 3 (CCPA 1978).

Thus, there is no prima facie case of obviousness with respect to any of the claims.

Nothing in the references, either singly or in combination, teaches or suggests the claimed features. Therefore, the references cannot anticipate nor render obvious the present invention as claimed.

In deciding that a novel combination would have been obvious, there must be supporting teaching in the prior art. There is no suggestion or motivation in the prior art to combine the elements as done by the present invention and hence the claims cannot be rendered obvious. In re Newell, 13 USPQ2d 1248, 1250 (CAFC, 1989).

LEVEL OF ORDINARY SKILL IN THE ART

A person having ordinary skill in the art is an artisan being taught the reference teachings.

SUMMARY

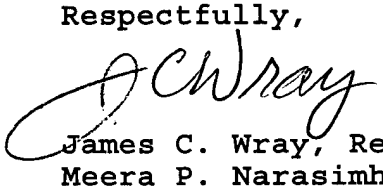
Each of the present claims is patentable under 35 U.S.C. 102(b) over the prior art of record.

When considering the present invention as a whole and the prior art to which the invention pertains as a whole, when considering the differences between the present invention and the prior art, and when considering the level of ordinary skill in the art to which the invention pertains, it is clear that the invention would not have been obvious under 35 U.S.C. 103(a) to a person having ordinary skill in the art at the time the invention was made.

CONCLUSION

Reversal of the Examiner and allowance of all the claims are respectfully requested.

Respectfully,



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APPENDIX

Appealed Claims

1. A conformable skin element system comprising one or more conformable skin elements, each skin element forming a pressure transducer and flow modifier, a controller, connections for coupling the conformable skin elements and the controller, a feedback control loop for generating and transmitting signals between the skin elements, the controller and the connections for conforming the skin elements to desired deformations.

2. The system of claim 1, wherein the controller is a micro-controller.

3. The system of claim 2, wherein the micro-controller comprises programmable computer chips for sensing and processing the signals from the feedback and for selectively activating the skin elements to desired deformations.

4. The system of claim 2, wherein the connections are electrical connections.

5. The system of claim 4, further comprising a power supply connected to the micro-controller.

6. The system of claim 1, wherein the skin elements are pressure-transducers and wherein the signals are pressure-transducer signals provided to the feedback loop.

7. The system of claim 6, wherein the feedback loop comprises amplifiers for amplifying the signals and filters for filtering the signals transmitted to the micro-controller.

15. The system of claim 1, wherein the skin elements are shaped elements.

17. The system of claim 15, wherein the shaped elements have a configuration of at least two sides.

18. The system of claim 17, wherein the shaped elements have a configuration of more than two sides.

19. The system of claim 1, further comprising a surface, wherein the skin elements are mounted on the surface.

20. The system of claim 19, wherein the surface is on a vehicle.

21. The system of claim 20, wherein the surface is on an aerodynamic part of the vehicle.

22. The system of claim 21, wherein each skin element has a vehicle conformable shape from a mounting perimeter after activation.

23. The system of claim 22, wherein the conformable shape corresponds to a mounting pattern of the skin elements on the surface.

24. The system of claim 1, wherein the system is an active vortex controller.

25. The system of claim 1, wherein the skin elements comprise actuatable material.

26. The system of claim 25, wherein the material is piezoelectric material.

27. The system of claim 26, wherein the piezoelectric material is selected from a group consisting of piezo-ceramic,

piezo-ceramic with metal shim, piezoelectric bimorph, piezo-film, and combinations thereof.

28. The system of claim 25, wherein the actuatable material is selected from a group consisting of electrical, mechanical, electromechanical, electromagnetic, electrothermal actuatable material and combinations thereof.

29. The system of claim 25, wherein the material is selected from a group consisting of shape-changing materials sensitive to temperature, light, pneumatic, hydraulic, magnetic effects and combinations thereof.

30. The system of claim 25, wherein the material is selected from a group consisting of shape memory alloys, magnetic elements and combinations thereof.

31. Active vortex control apparatus comprising a surface, a skin element mounted on the surface, the skin element forming a pressure transducer and flow modifier on the surface, a micro-controller coupled to the skin element, a power supply connected to the micro-processor, a feedback loop communicating with the skin element and the micro-processor for controlling activation of the skin-element corresponding to surface pressures on the skin element.

32. The apparatus of claim 31, wherein the feedback loop is a closed-loop system.

33. The apparatus of claim 31, further comprising additional pressure transducers communicating with the feedback loop.

34. The apparatus of claim 33, wherein the additional pressure transducers are additional layers of the skin element.

35. The apparatus of claim 33, wherein the additional pressure transducers are one or more layers of the skin element.

36. The apparatus of claim 31, further comprising wires communicating with the skin element, the feedback loop, and the micro-controller for conducting voltage to the skin element and for transmitting pressure signals from the skin element via the feedback loop to the micro-processor.

37. The apparatus of claim 31, further comprising mounts on the surface for mounting the skin element.

40. The apparatus of claim 37, wherein the mounts are cantilevered on the skin element for allowing a cantilever deflection of the skin element.

41. The apparatus of claim 31, wherein the surface is an aerodynamic forebody.

42. The apparatus of claim 41, further comprising plural skin elements mounted circumferentially about a tip of the forebody.

43. The apparatus of claim 42, wherein the plural skin elements comprise two skin elements mounted one on either side of a windward ray of the forebody.

44. The apparatus of claim 43, wherein the two skin elements are mounted about 50-120 degrees apart from each other.

45. The apparatus of claim 42, wherein the skin elements are evenly disposed about a nose of the forebody for accommodating roll variability.

46. The apparatus of claim 42, wherein the skin elements are concentrated on a windward half of the surface having no roll variability.

47. The apparatus of claim 42, wherein the skin elements are shaped elements.